AP1115

0.6A Low Dropout Positive Adjustable or Fixed-Mode Regulator

■ Features

- 1.3V maximum dropout at full load current
- Fast transient response
- Output current limiting
- Built-in thermal shutdown
- Packages: SOT89, TO92
- Good noise rejection
- 3-Terminal Adjustable or Fixed 1.5V / 1.8V / 2.5V / 2.8V / 3.0V / 3.3V / 3.5V / 5.0V

■ Applications

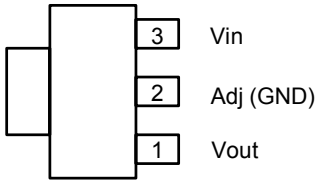
- PC peripheral
- Communication

■ General Description

AP1115 is a low dropout positive adjustable or fixed-mode regulator with minimum of 0.6A output current capability. The product is specifically designed to provide well-regulated supply for low voltage IC applications such as high-speed bus termination and low current 3.3V logic supply. AP1115 is also well suited for other applications such as VGA cards. AP1115 is guaranteed to have <1.3V dropout at full load current making it ideal to provide well regulated outputs of 1.25V to 5V with up to 18V input supply.

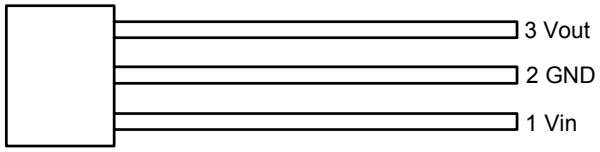
■ Connection Diagram (Top View)

AP1115A-3 PIN SOT89

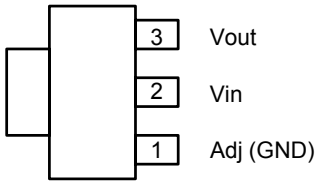


Tab is Pin2

AP1115A-3 PIN TO92

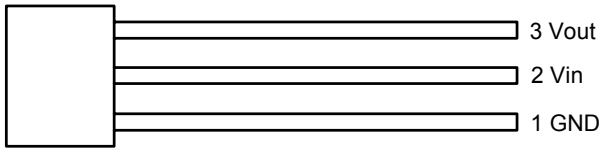


AP1115B-3 PIN SOT89



Tab is Pin2

AP1115B-3 PIN TO92



■ Pin Descriptions

NAME	I/O	FUNCTION
Adj (GND)	I	A resistor divider from this pin to the Vout pin and ground sets the output voltage. (Ground only for Fixed-Mode)
Vout	O	The output of the regulator. A minimum of 10uF capacitor (0.15Ω ≤ ESR ≤ 20Ω) must be connected from this pin to ground to insure stability.
Vin	I	The input pin of regulator. Typically a large storage capacitor (0.15Ω ≤ ESR ≤ 20Ω) is connected from this pin to ground to insure that the input voltage does not sag below the minimum dropout voltage during the load transient response. This pin must always be 1.3V higher than Vout in order for the device to regulate properly.

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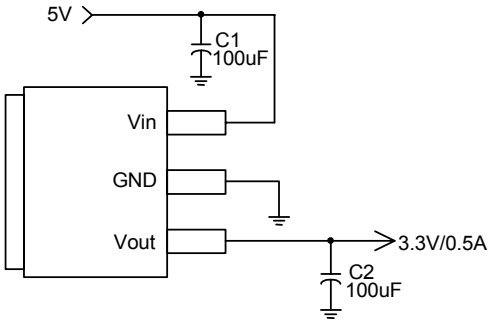
0.6A Low Dropout Positive Adjustable or Fixed-Mode Regulator

■ Ordering Information

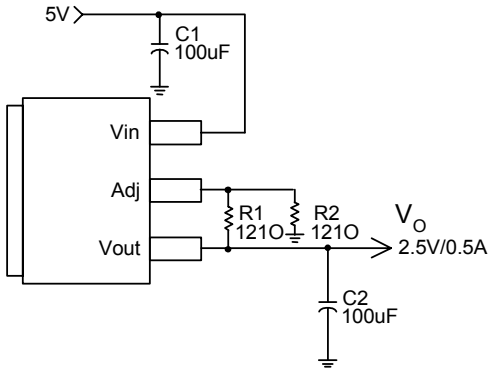
AP1115 X X XX X X

Low Dropout Regulator	Pin Version	Package	Vout	Lead Free	Packing
	A: Pin1:Vout 2:Adj(GND) 3:Vin B: Pin1:Adj(GND) 2:Vin 3:Vout	Y : SOT89-3L V : TO92-3L	Blank : ADJ 15 : 1.5V 18 : 1.8V 25 : 2.5V 28 : 2.8V 30 : 3.0V 33 : 3.3V 35 : 3.5V 50 : 5.0V	Blank : Normal L : Lead Free Package	Blank : Tube A : Taping

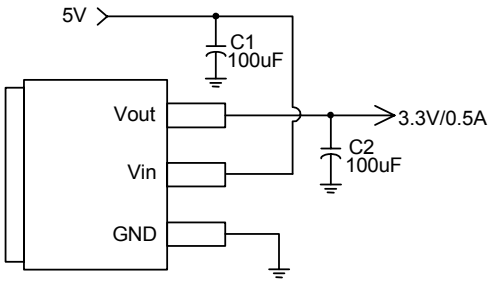
■ Typical Circuit



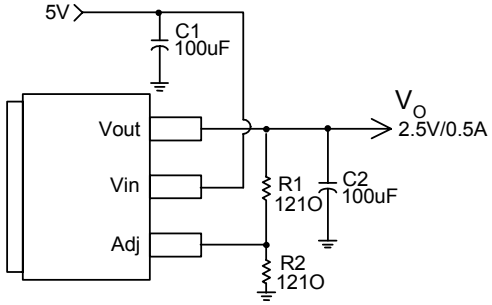
AP1115A (5V/3.3V fixed output)



AP1115A (5V/2.5V Adj output)



AP1115B (5V/3.3V fixed output)



AP1115B (5V/2.5V Adj output)

Note: $V_o = V_{REF} * (1 + \frac{R_2}{R_1})$

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■ Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{IN}	DC Supply Voltage	-0.3 to 18 V	V
P_D	Power Dissipation	Internally Limited	
T_{ST}	Storage Temperature	-65 to +150	°C
T_{OP}	Operating Junction Temperature Range	0 to +150	°C

■ Electrical Characteristics (Under Operating Conditions)

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNIT
Reference Voltage	AP1115-ADJ	T_J=25°C,(V_{IN}-V_{OUT})=1.5V I_O=10mA	1.225	1.250	1.275	V
Output Voltage	AP1115-1.5	I_{OUT} = 10mA, T_J = 25°C, 3V≦V_{IN}≦12V	1.470	1.500	1.530	V
	AP1115-1.8	I_{OUT} = 10mA, T_J = 25°C, 3.3V≦V_{IN}≦12V	1.764	1.800	1.836	V
	AP1115-2.5	I_{OUT} = 10mA, T_J = 25°C, 4V≦V_{IN}≦12V	2.450	2.500	2.550	V
	AP1115-2.8	I_{OUT} = 10mA, T_J = 25°C, 4.3V≦V_{IN}≦12V	2.744	2.800	2.856	V
	AP1115-3.0	I_{OUT} = 10mA, T_J = 25°C, 4.5V≦V_{IN}≦12V	2.940	3.000	3.060	V
	AP1115-3.3	I_{OUT} = 10mA, T_J = 25°C, 4.8V≦V_{IN}≦12V	3.235	3.300	3.365	V
	AP1115-3.5	I_{OUT} = 10mA, T_J = 25°C, 5V≦V_{IN}≦12V	3.430	3.500	3.570	V
	AP1115-5.0	I_{OUT} = 10mA, T_J = 25°C, 6.5V≦V_{IN}≦12V	4.900	5.000	5.100	V
Line Regulation	AP1115-XXX	I_O=10mA,V_{OUT}+1.5V<V_{IN}<15V, T_J=25°C	-	-	0.2	%
Load Regulation	AP1115-ADJ	V_{IN}=3.3V,Vadj=0,0mA<Io<0.6A, T_J=25°C (Note 1,2)	-	-	1	%
	AP1115-1.5	V_{IN}=3V, 0mA<Io<0.6A, T_J=25°C (Note 1,2)	-	12	15	mV
	AP1115-1.8	V_{IN}=3.3V, 0mA<Io<0.6A, T_J=25°C (Note 1,2)	-	15	18	mV
	AP1115-2.5	V_{IN}=4V, 0mA<Io<0.6A, T_J=25°C (Note 1,2)	-	20	25	mV
	AP1115-2.8	V_{IN}=4.3V, 0mA<Io<0.6A, T_J=25°C (Note 1,2)	-	22	28	mV
	AP1115-3.0	V_{IN} =5V, 0≦I_{OUT}≦0.6A, T_J=25°C (Note 1,2)	-	23	30	mV
	AP1115-3.3	V_{IN} =5V, 0≦I_{OUT}≦0.6A, T_J=25°C (Note 1,2)	-	26	33	mV
	AP1115-3.5	V_{IN} =5V, 0≦I_{OUT}≦0.6A, T_J=25°C (Note 1,2)	-	28	35	mV
	AP1115-5.0	V_{IN} =8V, 0≦I_{OUT}≦0.6A, T_J=25°C (Note 1,2)	-	40	50	mV
Dropout Voltage (V_{IN}-V_{OUT})	AP1115-ADJ/1.5/1.8 2.5/2.8/3.0/3.3/3.5/5.0	I_{OUT} = 0.6A, ΔV_{OUT}=0.1%V_{OUT}	-	1.1	1.3	V
Current Limit	AP1115-ADJ/1.5/1.8 2.5/2.8/3.0/3.3/3.5/5.0	(V_{IN}-V_{OUT}) = 5V	0.7	-	-	A
Minimum Load Current	AP1115-XXX	0°C≦Tj≦125°C	-	5	10	mA
Thermal Regulation	T_A=25 °C, 30ms pulse		-	0.008	0.04	%/W

■ Electrical Characteristics (Continued) (Under Operating Conditions)

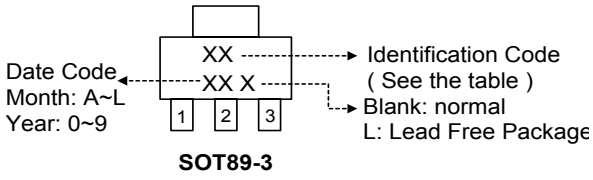
Ripple Rejection	F=120Hz,C_{OUT}=25uF Tantalum, I_{OUT}=0.6A					
	AP1115-XXX	V_{IN}=V_{OUT}+3V	-	60	70	dB
Temperature Stability	I_O=10mA		-	0.6	-	%
θ_{JA}	Thermal Resistance Junction-to-Ambient (No heat sink; No air flow)	SOT89	-	300	-	°C/W
		TO92	-	160	-	
θ_{JC}	SOT89: Control Circuitry/Power Transistor Thermal Resistance Junction-to-Case		-	100	-	°C/W

Note1: See thermal regulation specifications for changes in output voltage due to heating effects. Line and load regulation are measured at a constant junction temperature by low duty cycle pulse testing. Load regulation is measured at the output lead = 1/18" from the package.

Note2: Line and load regulation are guaranteed up to the maximum power dissipation of 5W. Power dissipation is determined by the input/output differential and the output current. Guaranteed maximum power dissipation will not be available over the full input/output range.

Note3: Quiescent current is defined as the minimum output current required to maintain regulation. At 12V input/output differential the device is guaranteed to regulate if the output current is greater than 10mA.

■ Marking Information

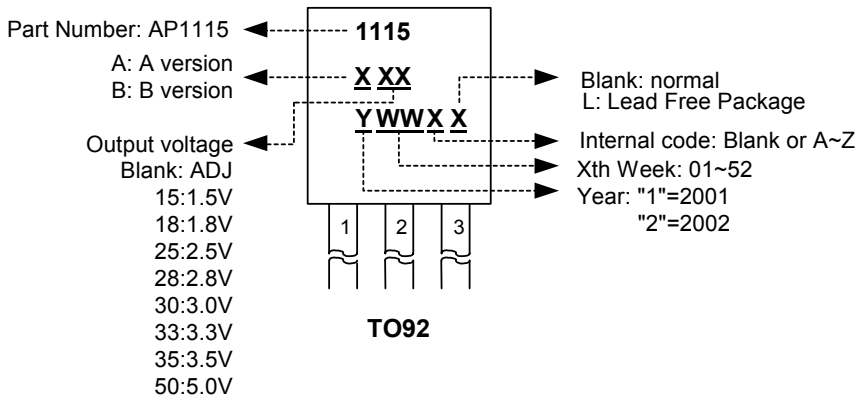


SOT89-3

Identification Code

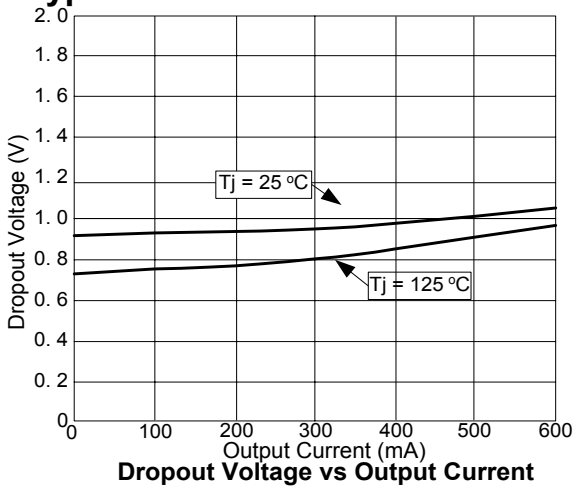
Output version	Part Number	
	AP1115A	AP1115B
ADJ	JO	JU
1.5V	JP	JV
1.8V	JQ	JW
2.5V	JR	JX
2.8V	JC	JD
3.0V	JM	JN
3.3V	JS	JY
3.5V	JK	JL
5.0V	JT	JZ

(Top View)

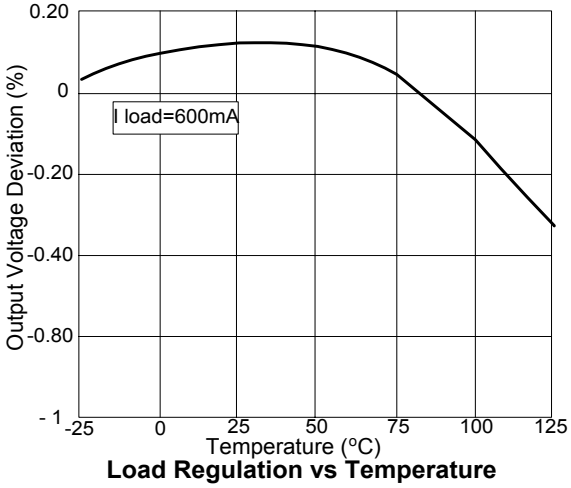


TO92

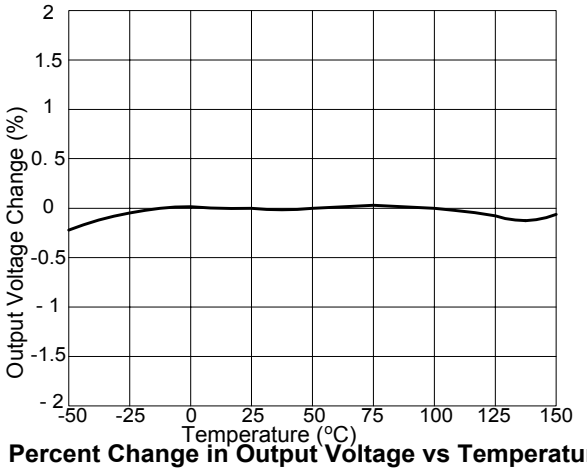
■ Typical Performance Characteristics



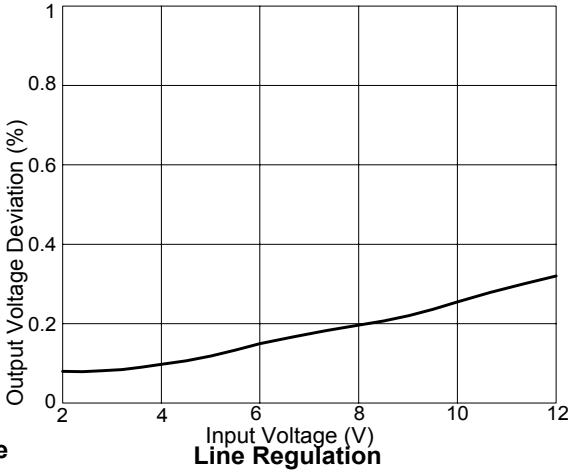
Dropout Voltage vs Output Current



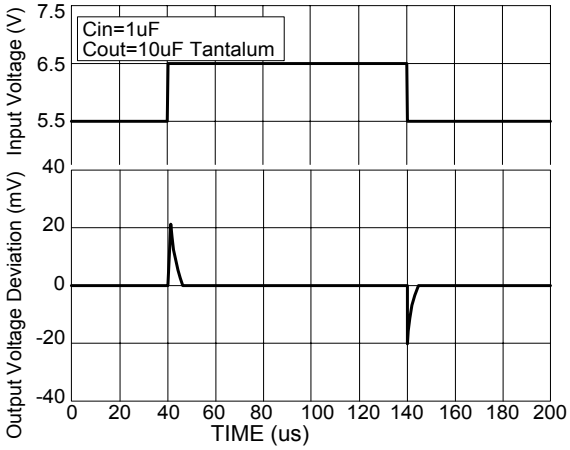
Load Regulation vs Temperature



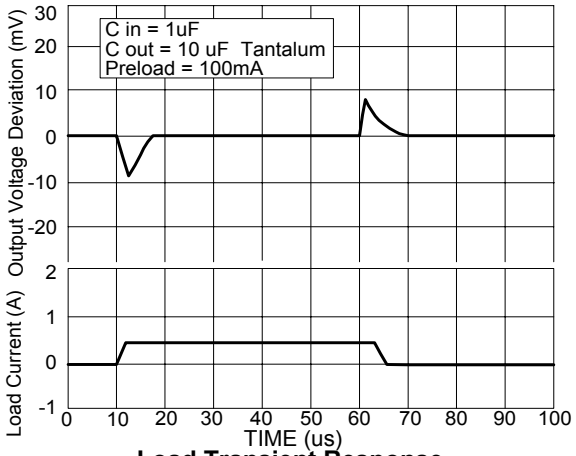
Percent Change in Output Voltage vs Temperature



Line Regulation



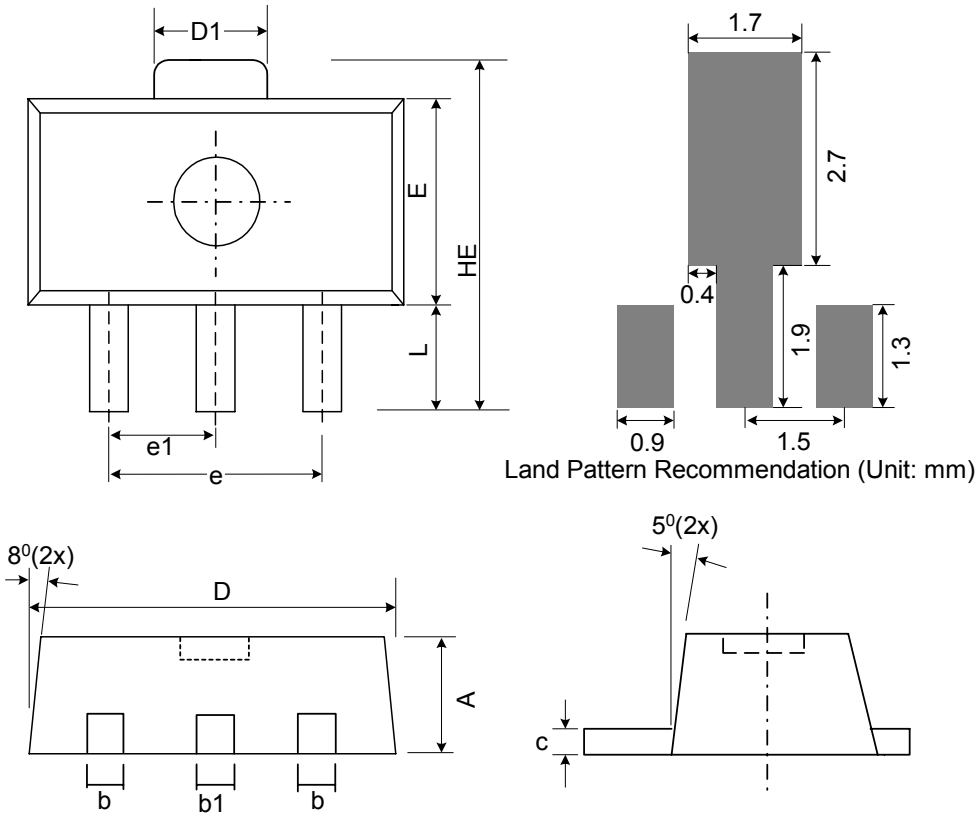
Line Transient Response



Load Transient Response

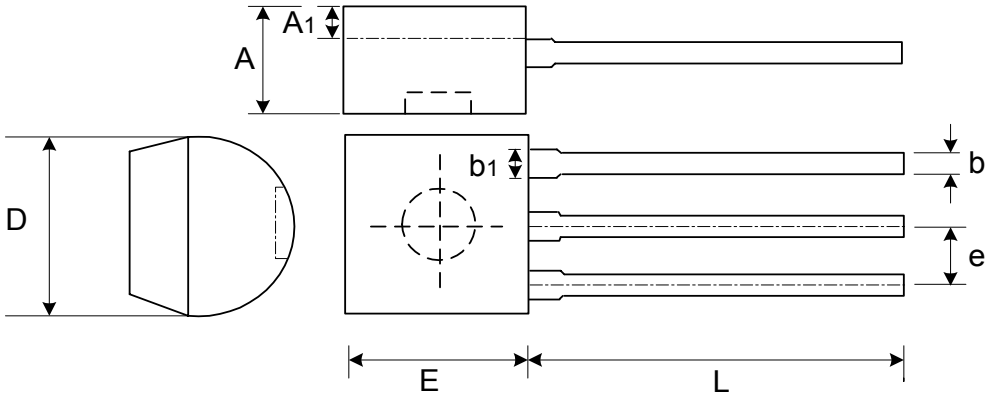
■ Package Information

(1) Package Type: SOT89-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.40	1.50	1.60	0.055	0.059	0.063
b	0.36	0.42	0.48	0.014	0.016	0.018
b1	0.41	0.47	0.53	0.016	0.043	0.051
C	0.35	0.39	0.43	0.014	0.015	0.017
D	4.40	4.50	4.60	0.173	0.177	0.181
D1	1.40	1.60	1.75	0.055	0.062	0.069
e	2.90	3.00	3.10	0.114	0.118	0.122
e1	1.45	1.50	1.55	0.057	0.059	0.061
E	2.35	2.48	2.60	0.093	0.098	0.102
HE	3.94	-	4.25	0.155	-	0.167
L	0.80	-	1.20	0.031	-	0.047

(2) Package Type: TO92-3L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	3.302	3.556	3.810	0.130	0.140	0.150
A1	1.016	-	-	0.040	-	-
b	0.330	0.381	0.432	0.013	0.015	0.017
b1	0.406	0.457	0.506	0.016	0.018	0.020
D	4.445	4.572	4.699	0.175	0.180	0.185
E	4.445	4.572	4.699	0.175	0.180	0.185
L	13.00	-	15.50	0.512	-	0.610
e	1.150	1.270	1.390	0.045	0.050	0.055